

APPENDIX L

Input: 1. A dataset consist of continuous and dummy variables that it is normalized,
X;
2. A target variable y.

Output: 1. Selected Principle Components W
2. Corresponding loading matrix U
3. success //a flag indicating whether SVD successful: 0; or not:0

Parameter : Percentage variance to keep AE. Default 0.9. Range : 0.8~0.95.

Process:

```
NE = XT*X;           //NE is the normal equation matrix
[U S V] = svd(NE); //use svdcmp function from Numeric Recipe
If SVD succeeds
    success = 0
Else
    success = -1,
    W and U both empty
End If
Sort the singular values in S in descending order;
Re-arrange columns in U, make them still correspond to their singular values;
Set n = the number of columns in X;
enough_e = n * AE;
sume = 0;
TU = empty; TW = empty;
i = 1;
While (sume < enough_e and S(i,i) > 0.1)
    TU = [TU, U(:,i)]; //U(:,i) is the i-th column of U
    TW = [TW, W(:,i)]; // W(:,i) is the i-th column of W
    sume += S(i,i);
    i++;
End While;
While (S(i,i) > 0.1)
    corr = absolute value of correlation of W(:,i) and y;
    If (corr > 0.3)
        TU = [TU, U(:,i)];
        TW = [TW, W(:,i)];
    End If
    i++;
End While
U = TU; W = TW;
Return W, U, success.
```